








USGS NSF GRIP Opportunity

 USGS Center:	Washington Water Science Center
 Project Title:	Assessing Sediment and Toxic Chemical Loads to the Lower Duwamish Waterway, Seattle, Washington
 Project Hypothesis or Objectives:	<p>The sediments in the Lower Duwamish Waterway Superfund site in Seattle, Washington are contaminated with polychlorinated biphenyls (PCBs), metals and other toxic contaminants. Remediation of the contaminated sediments is underway, but the success of the remediation depends, in part, on the quality of new sediment that is transported from the watershed by the Green/Duwamish River to the Superfund site that is the final 5 miles of the river before it enters Puget Sound, Washington. The watershed is influenced by a complex storm-drain system draining overland runoff into the river, as well as regulated flows from the Howard Hanson dam in the upper watershed, and Puget Sound tides resulting in bi-directional flows that can extend at least 10 miles upstream from the mouth of the river. A 5-year USGS project, which began in 2013, is studying the sediment and chemical loading dynamics from the Green River to the Lower Duwamish Waterway. The USGS is collecting samples of water, suspended sediment, and bed sediment during storms, dam releases, and baseline conditions for analysis of a range of toxic organic chemicals and physical sediment characteristics. The results are related to continuous records of streamflow and turbidity to estimate annual sediment and chemical loads transported by the Green/Duwamish River to the Lower Duwamish Waterway.</p>
 Duration:	9-12 months
 Internship Location:	Tacoma, WA
 Area of Discipline:	Hydrology, Chemistry, Geomorphology, Fluvial Mechanics, Civil Engineering, Watershed Science, Environmental Science
 Expected Outcome:	The intern will gain skills and experience using modern field instruments and USGS techniques for the determination of river water and sediment characteristics. The intern will analyze field data to provide critical new information regarding the timing and extent of upstream and downstream movement of water, sediment,

salt, and chemicals in a complex, tidally-influenced river system. The intern will evaluate the comparability of different sediment sampling or surrogate techniques, including LISST instruments, acoustic backscatter, continuous turbidity, and discrete measurements of suspended sediment concentration and particle-size distribution. The results will improve estimates of annual sediment and chemical loads into the Lower Duwamish Waterway in support of ongoing Superfund remediation activities. These data will assist in understanding and describing the Nation's water resources, particularly with regard to the issue of the prevention, reduction and control of toxics and nutrients entering coastal waters in the United States.



**Special skills/training
Required:**

The intern must possess a Bachelor's and (or) Master's degree in hydrology, geology, chemistry, biology, engineering, environmental science, or a related discipline. Experience in surface water hydrodynamics, geomorphology, modeling, or chemistry is preferred. The intern must be willing and able to work outdoors, often in cold or wet conditions, be able to lift and carry equipment weighing at least 25 pounds, and have a valid Driver's License.



Duties/Responsibilities:

The intern will investigate the streamflow, sediment, salt, and chemical dynamics in a complex tidal river system using a variety of field technologies. The technologies may include acoustic Doppler velocity meters, continuous water-quality sensors, samplers for depth- and width-integrated water samples, flow- or turbidity-triggered automatic compositing samplers, and continuous-flow centrifugation for suspended sediment sampling. The intern may also use the Laser In-Situ Scattering and Transmissometry (LISST) series of instruments to provide real-time, high-temporal resolution data on suspended-sediment concentration and particle-size distribution in the Green/Duwamish River. The intern will examine sediment dynamics as affected by season, event type, tides, and location within the river's vertical, horizontal, and longitudinal cross-section.



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